

# Communities and Ecosystems

## Chapter Objectives

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### Opening Essay

Describe the value and benefits of natural ecosystems.

### Community Structure and Dynamics

- 37.1 Define a biological community. Explain why the study of community ecology is important.
- 37.2 Define interspecific competition, mutualism, predation, herbivory, and parasitism, and provide examples of each.
- 37.3 Define an ecological niche. Explain how interspecific competition can occur when the niches of two populations overlap.
- 37.4 Describe the mutualistic relationship between corals and dinoflagellates.
- 37.5 Define predation. Describe the protective strategies potential prey employ to avoid predators.
- 37.6 Explain why many plants have chemical toxins, spines, or thorns. Define coevolution and describe an example.
- 37.7 Explain how parasites and pathogens can affect community composition.
- 37.8 Identify and compare the trophic levels of terrestrial and aquatic food chains.
- 37.9 Explain how food chains interconnect to form food webs.
- 37.10 Describe the two components of species diversity. Explain why large fields of a single crop are vulnerable to devastating disease.
- 37.11 Define a keystone species. Explain why the long-spined sea urchin is considered a keystone species.
- 37.12 Explain how disturbances can benefit communities. Distinguish between primary and secondary succession.
- 37.13 Explain how invasive species can affect communities.

### Ecosystem Structure and Dynamics

- 37.14 Compare the movement of energy and chemicals within and through ecosystems.
- 37.15 Compare the primary production of tropical rain forests, coral reefs, and open ocean. Explain why the differences between them exist.
- 37.16–37.17 Describe the movement of energy through a food chain. Explain why there are more producers than consumers and why eating meat counts as a great luxury.
- 37.18–37.21 Explain how carbon, nitrogen, and phosphorus cycle within ecosystems.
- 37.22 Explain how rapid eutrophication of aquatic ecosystems affects species diversity and oxygen levels.
- 37.23 Explain how human activities are threatening natural ecosystems.

## Key Terms

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abiotic reservoirs	ecological niche	nitrogen fixation
biogeochemical cycles	ecological succession	predation
biological control	ecosystem	primary consumer
biomass	energy flow	primary production
chemical cycling	food chain	primary succession
coevolution	food web	producers
community	herbivory	quaternary consumer
decomposers	interspecific competition	secondary consumer
decomposition	interspecific interactions	secondary succession
detritivore	invasive species	species diversity
detritus	keystone species	sustainability
disturbances	mutualism	tertiary consumer

## Word Roots

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**a-** = without; **bio-** = life (*abiotic reservoir*: a part of an ecosystem where a chemical, such as carbon or nitrogen, accumulates or is stockpiled outside of living organisms)

**geo-** = Earth (*biogeochemical cycle*: any of the various chemical circuits that involve both biotic and abiotic components of an ecosystem)

**de-** = from, down, out (*decomposer*: prokaryotes and fungi that secrete enzymes that digest organic material and break it down into inorganic forms)

**detrit-** = wear off (*detritus*: dead organic matter); **-vora** = eat (*detritivore*: an organism that consumes organic wastes and dead organisms)

**herb-** = grass; **-vora** = eat (*herbivory*: the consumption of plant material by an animal)

**inter-** = between (*interspecific interactions*: interactions between organisms of different species)

**mutu-** = reciprocal (*mutualism*: an interspecific relationship in which both partners benefit)

**quatr-** = four (*quaternary consumer*: an organism that eats tertiary consumers; the fourth step on the food chain)

**terti-** = three (*tertiary consumer*: an organism that eats secondary consumers; the third step on the food chain)